



Dvorak Technique

For Prelims: Dvorak Technique of Weather Forecasting, Cloud Pattern Recognition Technique, Meteorology.

For Mains: Dvorak Technique and its Utility today.

Why in News?

Recently, the American **meteorologist Vernon Dvorak** passed away, on whom **Dvorak Technique** was named to forecast Weather.

- Dvorak was an American meteorologist best **credited for developing the Dvorak (read as Dora-k) technique** in the early 1970s.

What is the Dvorak technique?

- The Dvorak technique is a **Cloud Pattern Recognition Technique (CPRT)** based on a concept model of the **development and decay** of the **tropical cyclone**.
- It was first developed in 1969 and tested for **observing storms in the northwest Pacific Ocean**.
- In this methodology, available satellite images obtained from **polar orbiting satellites** are used to **examine the features of the developing tropical storms** (hurricanes, cyclones and typhoons).
 - During day time, images in the visible spectrum are used while at night, the **ocean is observed using infrared images**.
- From the satellite images the technique **helps forecasters do a pattern recognition** from the observed structure of the **storm, locate its eye and estimate the intensity** of the storm.
- Although it cannot help make any predictions, measure wind or pressure or any other meteorological parameters associated with the cyclone, it is **a guide to estimate the storm's intensity and possible intensification** — which is **crucial for local administration in planning evacuation measures** of coastal or other nearby residents.

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DEVELOPMENTAL PATTERN TYPES	PRE STORM	TROPICAL STORM		HURRICANE PATTERN TYPES		
		(Minimal)	(Strong)	(Minimal)	(Strong)	(Super)
	T1.5 - 4	T2.5	T3.5	T4.5	T5.5	T6.5 - T8
CURVED BAND PRIMARY PATTERN TYPE						
CURVED BAND EIR ONLY						
CDO PATTERN TYPE VIS ONLY						
SHEAR PATTERN TYPE				EYE TYPES		

Why is Technique still Widely in Use?

- Even having an improved network of land-based meteorological observations, ocean **observations still remain limited.**
- There are many regions across the four oceans that have not been **fully examined with meteorological instruments.**
- Ocean observations are **mostly taken by deploying buoys or dedicated ships**, but the number of observations from the seas is **still not sufficient across the world.**
- That is why meteorologists have had to **depend more on satellite-based imageries, and combine it with the available ocean-data** at the time of forecasting the intensity and wind speed of the tropical cyclones.
- The **Dvorak technique has undergone several advancements** since its inception. Even in the present day, when forecasters have access to several state-of-the-art tools like model guidance, animations, artificial intelligence, machine learning and satellite technology, it is the advanced versions of the Dvorak technique that continues to be widely used.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q1. Consider the following statements: (2020)

1. Jet streams occur in the Northern Hemisphere only.
2. Only some cyclones develop an eye.
3. The temperature inside the eye of a cyclone is nearly 10°C lesser than that of the surroundings.

Which of the statements given above is/are correct?

- (a) 1 only
 (b) 2 and 3 only
 (c) 2 only
 (d) 1 and 3 only

Ans: (c)

Exp:

- Jet Stream is a geostrophic wind blowing horizontally through the upper layers of the troposphere, generally from west to east, at an altitude of 20,000 - 50,000 feet. Jet Streams develop where air

masses of different temperatures meet. So, usually surface temperatures determine where the Jet Stream will form. Greater the difference in temperature, faster is the wind velocity inside the jet stream. **Jet Streams extend** from 20° latitude to the poles in **both hemispheres. Hence, statement 1 is not correct.**

- Cyclones are of two types, tropical cyclone and temperate cyclone. The center of a tropical cyclone is known as the 'eye', where the wind is calm at the center with no rainfall. However, **in a temperate cyclone**, there is not a single place where winds and rains are inactive, so the **eye is not found. Hence, statement 2 is correct.**
- The warmest temperatures are found in the eye itself, not in the eyewall clouds where the latent heat occurs. The air is saturated only where convective vertical motions pass through flight level. Inside the eye, the temperature is greater than 28°C and the dewpoint is less than 0°C. These warm and dry conditions are typical of the eyes of extremely intense tropical cyclones. **Hence, statement 3 is not correct.**
- **Therefore, option (c) is the correct answer.**

Q2. In the South Atlantic and South-Eastern Pacific regions in tropical latitudes, cyclone does not originate. What is the reason? (2015)

- (a) Sea surface temperatures are low
- (b) Inter-Tropical Convergence Zone seldom occurs
- (c) Coriolis force is too weak
- (d) Absence of land in those regions

Ans: (b)

Exp:

- The most proximate reasons for the lack of cyclones in the South Atlantic and South Eastern Pacific ocean is the rare occurrence of the Inter-Tropical Convergence Zone (ITCZ) over the region.
- It becomes very difficult or nearly impossible to have genesis of tropical cyclones, unless synoptic vorticity (it is a clockwise or counterclockwise spin in the troposphere) and convergence (i.e., large scale spin and thunderstorm activity) are provided by ITCZ.
- **Therefore, option (b) is the correct answer.**

Mains

Q. Discuss the meaning of colour-coded weather warnings for cyclone prone areas given by India Meteorological department. **(2022)**

Source: IE